TORNADO AT MAPLE PLAIN, MINN.

A destructive tornado visited Maple Plain and other points in the western portion of Hennepin County, Minn., during the evening of Sunday, August 18, 1907. Some mention of the storm is made in the August report of the Minnesota section of the Climatological Service, edited by Mr. U. G. Purssell, section director, who has sent us the original accounts. We are chiefly indebted to Mr. George W. Richards, the cooperative observer of the Weather Bureau at Maple Plain, which is about twenty miles west of Minneapolis.

According to Mr. Richards the hour was 7:35 p. m. The day had been warm and oppressive, the maximum temperature during the afternoon being 88°, and heavy, threatening clouds preceded the appearance of the tornado. No funnel-shaped cloud was observed, but there may have been such a cloud, obscured from view by the heavy downpour of rain.

The path of destruction varied in width from a few rods to a quarter of a mile. The severity of the storm was first felt near Lyndale, 4 miles southwest of Maple Plain, where grain and haystacks were torn down and scattered. Thence it moved northeast to Armstrong, 1 mile west of Maple Plain, where it did great damage to a barn, a graveyard, and the fields in its path. The tornado crost the railroad track half a mile west of Maple Plain and continued thru a belt of timber and an orchard, blowing down or breaking off many telegraph poles and trees. The greatest damage was done about a mile or more northeast of Maple Plain, where the tornado swept down a hill and with seemingly increased energy traveled along the southern shore of Lake Independence, demolishing several cottages and barns, in which many persons were injured, one of them fatally.

To the east of the lake the tornado laid flat a great deal of timber, and continuing toward Osseo did much damage in the vicinity of that town, which is 15 miles east-northeast of Maple Plain. The general direction of the motion of the storm was from west-southwest to east-northeast and the path was about 20 miles in length. The storm was evidently a tornado, as on the south edge of the path the trees were blown from the southwest or south, while on the north side the trees were blown from the northwest. Outside of the path of destruction a heavy windstorm prevailed. At Maple Plain 0.12 inch of rain fell Sunday morning and 1.70 inches in the evening.

It is worth noting that at 10 a. m. on the forenoon of the 18th a very severe wind and hailstorm had occurred 2 or 3 miles southeast and south of Maple Plain, a narrow strip extending from southwest to northeast being affected.—*H. C. H.*

HAIL SHOOTING IN ITALY.

The references to this subject in previous volumes of the MONTHLY WEATHER REVIEW have abundantly shown the probability that there is no rational basis for the efforts made in Italy and France to break up thunderstorms and prevent injurious hail by some method of cannonading. Neither the noise, nor the smoke, nor the heat, nor the commotion produced by grand vortex rings can be expected to have any considerable influence on the enormous cumuli from which hail and lightning proceed. This conviction is now confirmed by a report read before the Royal Academy of Sciences at Rome (Accademia dei Lincei), on December 2, 1906, by Senator P. Blaserna, who is also Professor of Physics in the Royal University at Rome, and President of the Accademia dei Lincei. In 1902, Professor Blaserna was appointed by the Italian Government president of a special commission to investigate this subject. A locality that had suffered extremely in previous years was chosen as the field of operations, viz, Castelfranco, in Venetia, and 222 cannon of the most approved special type manufactured by the Greinitz Company were established; each of these sends up a vortex ring 4 meters in diameter, and one additional cannon sending up a vortex 14 meters in diameter was subsequently added. As these vortices failed to ascend higher than 200 or 300 yards they evidently had no effect on the clouds; therefore a higher station, the Casa Aulagne di Monteux, was occupied, so that the vortex rings attained 1200 yards, but still no good results were perceived.

Then the secretary of war and the manufacturers of pyrotechnics were appealed to. Of the latter, Marazzi, at Rome, succeeded in constructing bombs weighing 8 kilograms that were carried up to 800 meters where they exploded. During 1906, 250 broadsides were fired by the 222 cannon at Aulagne, and 60 of the Marazzi bombs were sent up, but still no good effects were perceptible. These negative results of a five-year campaign justify the commission in recommending that the Italian Government no longer encourage such expensive and useless work.—*C. A.*

INFLUENCE OF THE GLASS COVER ON ACTINOMETRIC THERMOMETERS.

By LADISLAUS GORCZYNSKI.

[Translated from Meteorologische Zeitschrift, May, 1907, p. 212-218, by R. A. Edwards.

By actinometric thermometers we mean, in this memoir, mercurial thermometers in which the glass reservoir is not directly exposed to the sun's rays, but is covered by an absorbing layer of lampblack. It is clear that in such a case the primary source of heat variation lies in the absorbing layer of lampblack, so that the thermal condition of the whole thermometric body can not be deduced directly or simply from the indications of its purely thermometric part, i. e., the mass of mercury. It is entirely conceivable that, in some cases, the assumption that the actual temperature variation is identical with that of the mercury may be proper; but with the increasing complexity of the actinometric body the conditions are surely not always so simple, and in such cases a previous investigation of the actual distribution of temperature in the body will be absolutely necessary. It is, therefore, very important that it be clearly understood what is meant by "bodily temperature" in the case of a complex structure.

We will take up only one special case, and consider the actinometric thermometer constructed by Prof. O. Chwolson in 1893 according to the Ångström principle. We will, by this example, show what an important part must be attributed to the glass covering of the actinometric thermometer.

I. We will consider three superposed layers, consisting of lampblack, glass, and mercury.

In Table 1, where these layers are mentioned in their proper order, is given the notation adopted by us.

TABLE 1.—*Location of layers and adopted notation.*

	Thickness.	Temperature.	Surface.	Coefficient of internal conduction.
Air	....	τ	....	....
Lampblack	d'	θ' outer surface	s_1	k'
Glass	d	t_e outer surface t_i inner surface	s_2	k
Mercury	d''	θ''	s_3	k''

We wish to learn the difference, $\theta' - \theta''$, in case the outer layer of lampblack is exposed to the direct rays of the sun.

If by q we represent the intensity of the energy of the radiation (per unit of time and surface, always assuming a normal exposure), by h the coefficient of external conduction of heat, and by τ the temperature of the surrounding layer of air, we